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Cutworm Defoliators of Ryegrass[1]

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Abstract.—Cutworm species that constitute a common complex that defoliate ryegrasses in Oregon are: *Dargida procincta* (Grote), *Pseudaletia unipuncta* (Haworth), *Leucania pallens luteopallens* Grote, *Diarsia pseudorosaria* (Hardwick), *Peridroma saucia* (Hubner), and *Leucania insueta* Guenée. In this study *D. procincta* and *P. unipuncta* rapidly defoliated ryegrass by severing leaves and wasted more foliage than they ate. *D. pseudorosaria* and *L. p. luteopallens* slowly defoliated ryegrass and seldom wasted foliage by severing leaves. Black-light trap captures provided reasonably good estimates of adult flight of all species except *D. procincta.*

Various foliar feeding cutworms infest ryegrasses in the Pacific Northwest, but little is known about the importance or type of damage inflicted by many species. Among the cutworms common in ryegrass in the Willamette Valley of Oregon, *Pseudaletia unipuncta* (Haworth) and *Peridroma saucia* (Hübner) are well known pests (Bohart, 1948; Rice et al., 1982). Lesser known but common grass feeders include *Diarsia pseudorosaria* (Hardwick), *Leucania pallens luteopallens* Grote, *Leucania insueta* Guenée, and *Dargida procincta* (Grote) (Crumb, 1956). Of these species, Thompson (1943) considered *D. procincta* to be the most important pest.

The impact of ryegrass defoliators may become more important in seed production with the recent introduction of plant growth retardants that, in effect, decrease production of foliage and increase seed yields (Chilcote, 1983). This study was conducted to determine the dominant species and relative abundance of foliar feeding cutworms in seed fields of ryegrass. Also, greenhouse feeding tests were made to determine the type of feeding injury inflicted by individual species.

Materials and Methods

Seasonal flight of adults was monitored with battery-powered black-light traps placed in seed fields of ryegrass near Corvallis, Oregon. Traps were operated 3–4 nights weekly during the flight season. Then, mean daily trap captures were computed and multiplied times 7 so weekly data were comparable. Larval populations were estimated by collection of larvae from harvested seed on a field basis. When fields were windrowed for harvest, larvae sought shelter in, and often pupated within, the windrow. A large number of these larvae were carried along with seed into the combine. As harvested seed was unloaded, larvae curled up

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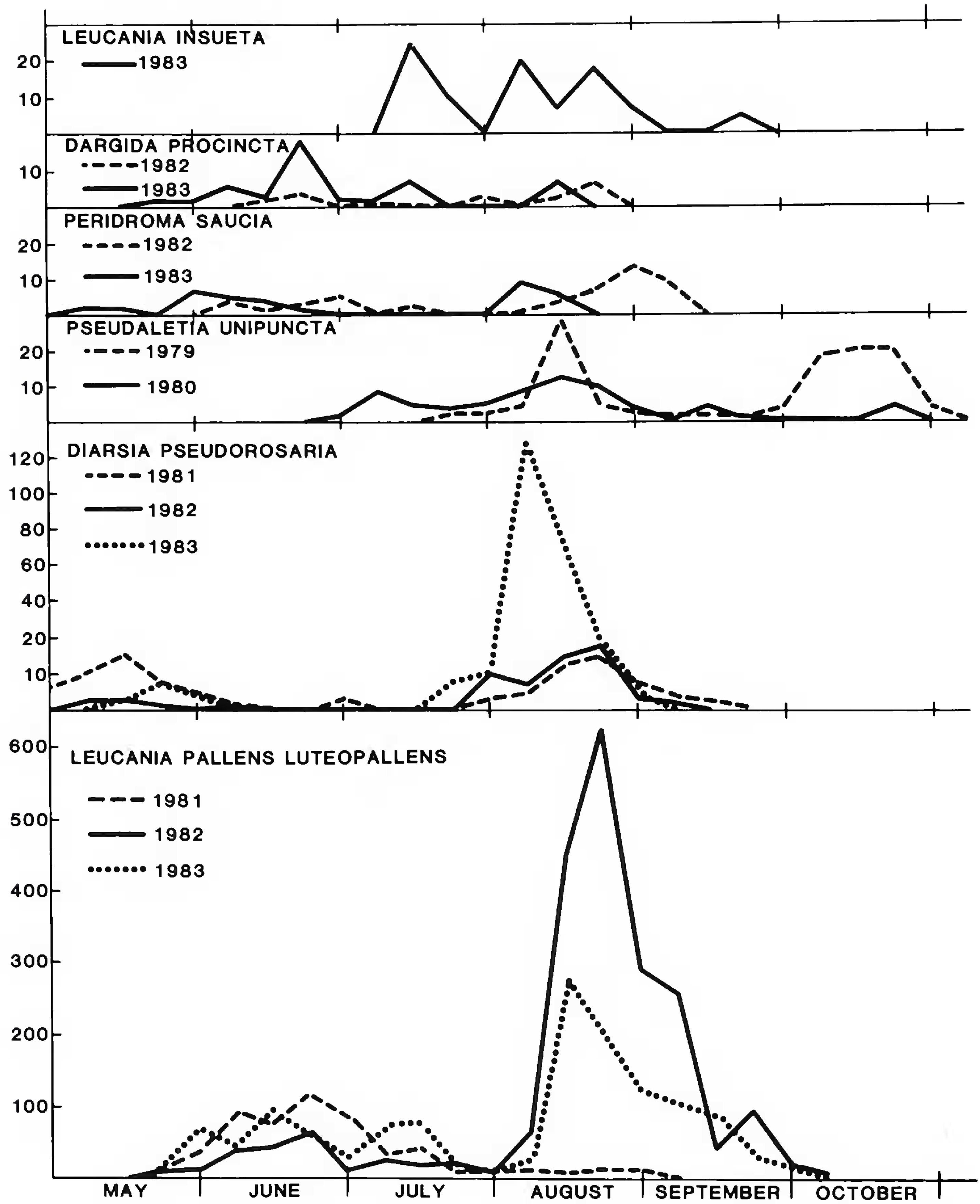

Figure 1. Captures of cutworm adults in commercial fields of ryegrass with black-light traps.

and rolled down the pile of seed. These larvae were collected until at least 100 specimens were obtained from each field. The larvae were taken to the laboratory to determine the percentage of each species in a given field.

Feeding tests were conducted in the greenhouse with densely seeded ryegrass grown in pots (15 cm wide) to a height of 30–40 cm. Larvae from the previously described collections were temporarily confined overnight in large freezer containers and fed leaves of ryegrass. The next day, 20 active and uninjured larvae (predominantly 4th–5th instars) were caged on individual pots of ryegrass. This

Table 1. Larval species composition of foliar feeding cutworms (%) obtained from several types of ryegrass during harvest, Corvallis, Oregon.

	Tetraploid		Annual				Perennial			
Cutworm	I[a]	II	III	IV	V	VI	VII	VIII	IX	$\bar{x}$
Dargida procincta	81	85	27	89	16	88	81	67	96	70
Leucania pallens luteopallens	6	3	26	2	54	1	7	10	1	12
Pseudaletia unipuncta	5	1	24	3	13	2	8	21	1	9
Diarsia pseudorosaria	5	8	12	3	16	3	1	2	0	6
Periodroma saucia	3	3	11	3	1	6	3	0	2	3

[a] Fields I, III, V, VI, VIII sampled in 1980; all others sampled in 1981.

procedure was replicated 4 times for each species of cutworm. Infested plants were observed daily for the type and degree of feeding damage inflicted by the larvae until the plants were defoliated.

Results and Discussion

Adult flight.—The species of moths captured in light traps in ryegrass were, in decreasing order of abundance: *L. p. luteopallens, D. pseudorosaria, P. unipuncta, L. insueta, P. saucia* and *D. procincta* (Fig. 1). The abundance of species was variable from year to year, especially the second generation of moths. For example, the August generation of *L. p. luteopallens* was barely detectable in 1981, but very strong in 1982. A strong second generation seems to occur only when rainfall is adequate to stimulate grass regrowth soon after harvest.

Larval populations.—The species found in larval samples in decreasing order of abundance were: *D. procincta, L. p. luteopallens, P. unipuncta, D. pseudorosaria* and *P. saucia. D. procinta* was by far the most abundant larval species (Table 1) and the least abundant in light traps. Often both larvae and pupae of this species were easily found in windrows when relatively few or no adults were captured in light traps. Apparently, the species is only weakly attracted to light traps. Based on larval samples, 5 species clearly constitute a common cutworm complex in all types of ryegrass. Three species were present in all fields, and the remaining two species were found in 8 of 9 fields (Table 1). The relative abundance of larvae of a given species varied among fields during the same year. For example, *L. p. luteopallens* constituted only 1% of the population in one field and 54% in another. Both fields were the same variety, and no insecticide was used on either field.

Feeding tests.—Larvae of 4 cutworm species were caged on ryegrass in the greenhouse to evaluate feeding behavior in relation to plant defoliation. Larvae of *D. procincta* and *P. unipuncta* initiated feeding on the margin of leaves near the base of the plant. After larvae had eaten halfway through the leaf for several cm, they often completely severed the leaf and then climbed on to a new leaf and repeated this behavior. The amount of leaf foliage wasted (not eaten) was substantially greater than the amount actually consumed by larvae of both species. The plants (30–40 cm in height) in all pots were completely defoliated by 20 larvae after 2 days, leaving developing seed culms severed 3–5 cm above the soil. The feeding behavior of both species was very similar.

In contrast, larvae of *L. p. luteopallens* fed along the leaf margins and often consumed the tissue on only one side of the leaf midrib. As feeding progressed toward the top of the leaf, the midrib was severed but some tissue remained so the leaf was partially attached. A few leaves were eventually severed but only after substantial amounts of foliage were consumed. Complete defoliation by 20 larvae required 8 days or 4 times as long as *D. procincta* or *P. unipuncta.*

Larvae of *L. pseudorosaria* also fed along the leaf margins and consumed nearly all the tissue on one side of the midrib of the leaf. Larvae rarely penetrated the midrib or wasted foliage by severing the leaf. These larvae consumed foliage rather slowly and none of the plants was completely defoliated by 20 larvae after 10 days. In fact, plant growth compensated for some defoliation during the test.

Light traps clearly were inadequate to assess adult populations of all species in the complex of infested ryegrasses. The relative abundance of species varied among fields and years, but the order of species dominance in light traps was about the same as in larval samples except for *D. procincta,* the most important defoliator of ryegrasses. Sampling larval populations will require visual inspection of lodged foliage, windrows, or harvested seed because sweeping with an insect net was not effective. Two considerations are important in assessing potential damage: 1) the propensity of the dominant species to sever developing culms and 2) relative abundance. Tests herein have shown that *D. procincta* and *P. unipuncta* were capable of severing leaves and culms, whereas *P. pseudorosaria* and *L. p. luteopallens* may contribute to defoliation but plant damage was less severe.

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